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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,908	03/15/2004	Martin Schamberg	PO-7955/HE-178	1492

157 7590 11/01/2007

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EXAMINER	
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ART UNIT	PAPER NUMBER
1796	

MAIL DATE	DELIVERY MODE
11/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/800,908
Filing Date: March 15, 2004
Appellant(s): SCHAMBERG ET AL.

John E. Mrozinski, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 8-31-07 appealing from the Office action mailed 3-29-07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

The amendment after final rejection filed on 6-29-07 has been entered.

The entered amendment, in fact, deleted the terminology "any filler" and replaced it with "the filler".

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection of claims 17-35

under 35 USC 112 2nd paragraph is withdrawn because it has been overcome by the amendment after final filed 6-29-07 that has been entered.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,789,457	EIBEN ET AL.	8-1998
5,547,276	SULZBACH ET AL.	8-1996
5,527,462	DAVIS ET AL.	6-1996
WO-02/04190	SULZBACH ET AL.	1-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 17-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eiben et al.(5,789,457) in view of Sulzbach et al.(5,547,276), Davis et al.(5,527,462), and WO 02/04190.

Eiben et al. disclose apparatuses for the continuous production of polyurethane foam wherein vessels for introducing isocyanate, polyol, liquid carbon dioxide, and other additives are provided for, a means for transporting the components to a main mixing component, a means mixing carbon dioxide with at least one of the reactive components prior to introduction to the main mixer, and a discharge body which includes at least one fine mesh screen of dimensions as claimed arranged downstream from the main mixer (see abstract, figures, description of figures, arrow 8 of the figures, and column 1 line 6 – column 6 line 17, as well as, the entire document).

Eiben et al. differs from the claims in that means for introducing and treating filler are not particularly required. However, Sulzbach et al. discloses devices for controlling the mixing of fillers into the reactive materials in polyurethane synthesis operations for the purpose of achieving continuous mixing of metered filler and reactive material (see abstract, and column 2 line 65 – column 3 line 14, as well as, the entire document). Accordingly, it would have been obvious for one having ordinary skill in the art to have employed the filler providing devices of Sulzbach et al. in the apparatuses provided for by Eiben et al. for the purpose of provisioning for the continuous mixing and introduction of filler in order to arrive at the apparatuses of appellants' claims with the expectation of success in the absence of a showing of new or unexpected results. Additionally, it is held that modifying elements for transporting filler containing mixtures through the

employment of filters for purpose of imparting their filtering and system clog reduction effects is an apparatus modification that is within the purview of the ordinary practitioner in the art. Further, the employment of mechanical self-cleaning filters such as those disclosed by Davis et al.(see the entire document) would have been obvious to one having ordinary skill in the art for the purpose of achieving in-process filter cleaning. Also, agglomerate reducers such as those disclosed by WO 02/04190 (see the entire document) are known to the art for purposes of enhancing material flow, and their employment in the apparatuses of Eiben et al. for the purpose of imparting this effect would have been obvious to one having ordinary skill in the art with the expectation of success in the absence of a showing of new or unexpected results.

(10) Response to Argument

Appellants' arguments have been considered. However, rejection is maintained.

Examiner maintains the position that filtering components for the purpose of separating materials from a component as determined by the filter mesh size is a modification within the skill of the ordinary practitioner in the practice of polyurethane foam forming systems. Although Eiben et al. does not provide a specific means for introducing and treating filler, it does provide a means for providing "additive" which encompasses "filler", and, additionally, Sulzbach et al. is maintained to be properly looked to for addressing the deficiencies of Eiben et al. pertaining to specifics of introducing and treating fillers. Davis et al. is maintained to be properly looked to in addressing the deficiencies in Eiben et al. pertaining to claims requiring self-cleaning

filters. Additionally, WO 02/04190 is maintained to be proper for providing for agglomerate reducing effects in filler materials.

Appellants' claims do not differentiate their apparatuses from the combined teachings of the cited prior art. Appellants' indication of the deficiencies of the individual references is not persuasive in refuting the rejection based on the combinations of teachings as set forth above.

Furthermore, as to apparatus elements (a) and (d) of appellants' claim 17, it is noted that the fine mesh screen employed in the apparatus of Eiben et al. meets the requirements of both element (a) and (d) of claim 17, and statements as to the presence of filler and the state that said filler is in during processing are irrelevant in refuting the applicability of the cited prior art in the instant case because the claims are directed towards apparatuses. It is held that the fine mesh screen employed in the apparatuses of Eiben et al. meet the definition of filter as defined by appellants' claims, and it is held that this fine mesh screen/filter is sufficiently located in the apparatus to be identified as being located in the means for transporting filler-containing mixture as required by the claims as they currently stand {element (a) of appellants' claimed apparatus} in addition to being the fine-meshed sieve downstream from the main mixer {element (d) of appellants' claimed apparatus} .

Appellants' arguments as to the prior art's failure to recognize particular treatments of materials and/or their state/form upon being transported through processing in apparatus parts are unpersuasive of patentable distinction because they are processing effects that relate to the intended use of the apparatus involved and,

accordingly, do not identify patentable distinction through reflected limitation in the claimed apparatuses.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

John M. Cooney, Jr.

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PRIMARY EXAMINER
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Conferees:

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APPEAL CONFEREE:

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Appeal Conferee

PTO 08-0551

CC = WO
20020117
A1
0204190

METHOD AND DEVICE FOR PRODUCING FOAMS
[Verfahren und Vorrichtung zum Herstellen von Schaumstoffen]

Hans-Michael Sulzbach et al.

UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. OCTOBER 2007
TRANSLATED BY: THE MCELROY TRANSLATION COMPANY

PUBLICATION COUNTRY	(19):	WO
DOCUMENT NUMBER	(10):	0204190
DOCUMENT KIND	(12):	A1
PUBLICATION DATE	(43):	20020117
APPLICATION NUMBER	(21):	PCT/EP01/07214
APPLICATION DATE	(22):	20010625
INTERNATIONAL CLASSIFICATION[7]	(51):	B 29 C 44/46 44/34 C 08 J 9/12
SUBMISSION LANGUGAE	(25):	German
PUBLICATION LANGUAGE	(26):	German
PRIORITY NUMBER	(30):	100 33 068.1
PRIORITY DATE	(30):	20000707
PRIORITY COUNTY	(30):	DE
INVENTORS	(72):	Hans-Michael Sulzbach et al.
APPLICANT	(71):	Hennecke GmbH
DESIGNATED CONTRACTING STATES		
(National)	(81):	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ,

		PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW
DESIGNATED CONTRACTING STATES (Regional)	(84):	ARIPO Patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, European Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI Patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG)
TITLE	(54):	METHOD AND DEVICE FOR PRODUCING FOAMS
FOREIGN TITLE	[54A]:	Verfahren und Vorrichtung zum Herstellen von Schaumstoffen

The invention pertains to a method and to a device for the production of foams made from at least two liquid reaction components which react with each other, whereby a powder, fibrous or fine-grain additive is admixed to at least one of these reaction components and a propellant which passes from the liquid state into the gaseous state after a corresponding sudden change in pressure, is admixed to at least one of these reaction components. /1*

The production of foams, in particular from polyurethane, by reaction of polyol with isocyanate, has long been known.

As a propellant for the formation of cells, those which are in the liquid state under the appropriate pressure, are commonly preferred, but after their relaxation by a sudden pressure change of the appropriate level, they pass into the gaseous state and are then available as cell gas for foaming up the reaction mixture. Now with regard to its environmental compatibility, carbon dioxide has proven to be particularly useful. To generate the pressure change or the needed relaxation, an appropriately designed discharge mechanism is placed behind the reaction mixer. In this regard, sieves with suitable mesh size, perforated plates, partition elements, sinter metal plates, loose ball fill or such, have proven useful; that is, elements which create a sudden pressure change on the reaction mixture loaded with propellant as it passes through, so that the propellant will pass from the liquid state into the gaseous state. Discharge mechanisms of this kind are commercially available and are known in technical parlance as "creamers" and "lay down devices".

Methods of this kind for the production of polyurethane foam are described in particular in documents EP-A 767 728, EP-A 777 564 and EP-A 794 857. In this case, 2-6 wt% of CO_2 is dissolved in at least one of the components (polyol, isocyanate) above the solubility equilibrium pressure of typically 6-20 bar. It is then mixed with the other component, again under pressure, and passed through a tight mesh sieve plate with several thousand perforations from 0.1-0.3 mm diameter and relaxed to /2

* [Numbers in right margin indicate pagination of the original text.]

normal pressure, whereby liquid foam with a raw density of 50-120 kg/m^3 (not considering the fillers) is obtained. Usually, the density of the liquid foam is additionally reduced by water added to the polyol component, which forms CO^2 in the reaction with isocyanate.

It turns out that these discharge mechanisms causing the sudden pressure change frequently plug up when reaction components or reaction mixtures loaded with additive substances in powder, fine fiber or fine-grain form are being processed. Therefore, the discharge of the reaction mixture loaded with additive substance will be inhomogeneous, and in particular for application to an outlet positioned substrate, such as in block foaming or in the production of plates, the application to the substrate will be irregular, so that a block or plate with an inhomogeneous cross section will be produced. Above all, there will be plugging of the sieve plates. It was found that a content of agglomerates with a dimension of more than 10 µm in an amount of less than 0.1% relative to the total amount of filler, will prevent the system from being operated for a period of more than a few hours.

The problem in the processing of reaction mixtures loaded with additives and a propellant is to shield the required, relaxing discharge mechanism against plugging.

This is achieved in that

a) the additive substance and/or the propellant is added to and thus mixed in with at least one of the reaction components,

b) whereby the propellant is admixed in the liquid state,

c) that this reaction mixture loaded with propellant is expelled through a discharging mechanism /3
which produces a sudden pressure drop, whereby the pressure change is adjusted so that the liquid propellant passes from the liquid state into the gaseous state, and

d) any forming agglomerates of additive substance are broken down before they reach the discharging mechanism.

Preferably the invention pertains to the production of polyurethane foams from polyol and isocyanate, but is also suitable for the production of other multicomponent foams.

Fine-grain additive substances, as a rule, consist of melamine, activated charcoal, chalks, calcium carbonate, heavy spar; powders such as graphite powder, ammonium polyphosphate or recycling powder; fibers, such as glass, aramide or plastic materials, in particular polypropylene fibers.

Suitable powder fillers typically have grain sizes from about 10-50 μm. Fibrous fillers have preferably a diameter from 6-14 μm and a length from 100-200 μm. It turns out that fillers of this kind, even after grinding and sifting, still have small percentages of coarse agglomerates or have newly formed, adhesion bonded agglomerates which will result in plugging of the discharge mechanisms after the pressure drop.

According to the invention, preferred fillers will be employed in an amount from 10-40 wt%, relative to the finished foam, that is, the polyol-filler dispersion will have between about 20 and 50 wt% of filler.

Even though the type of addition of the additive substances into one of the reaction components is not directly associated with the reduction of the generated agglomerates of additive substance, there are several possibilities for this addition which may provide certain advantages in a particular case, /4 depending on the type of loaded reaction components or on the additive substance. But these advantages can be determined mostly only by empirical means.

The dispersion of the fillers, preferably in the polyol component, takes place by means of standard agitation and dispersing equipment, with conveyance into the supply tank or directly in the supply tank. The supply tank is preferably kept under agitation in order to prevent any settling of the fillers.

According to a first embodiment of the new method, the same reaction components are used as carrier for the additive substance and propellant.

This has the advantage that the reaction components loaded with additive substance will be diluted again by the addition of the liquid propellant.

Alternatively, one of the reaction components is loaded with additive substance and the other reaction component is loaded with propellant.

Therefore, there will be a direct, mutual interaction of additive substance and propellant only after mixing of the two differently loaded reaction components with each other. But this kind of delayed interaction is of no consequence, since the reaction mixture will be discharged immediately after the mixing and foamed up.

For example, it is possible to admix one additive substance to one branch of a reaction component and propellant to the other branch, and then both loaded branches of the reaction component are premixed together before they are mixed with the second reaction component.

Also, one branch of the reaction component can be loaded with additive substance and the other branch with propellant, but then the two loaded branches of the reaction component are supplied /5 separately to the second reaction component and mixed with it.

In both variants, the addition of additive substances and of the propellant are easier to control, because they are not injected into the same component stream.

It is also possible to employ two different polyols as additional reaction components, in addition to isocyanate, and to load one of them with the additive substance.

It is an advantage in particular when one of the polyols is sensitive.

While it is possible to make the addition of additive substance and/or propellant on-line during the production, it is preferable first to prepare a batch (supply tank) of reaction components and additive substance.

Now according to the invention, the pre-dispersion present in the supply tank or produced on-line is subjected to an agglomerate reduction by means of high shear speeds and baffle forces, if necessary.

According to the invention, the agglomerate reduction takes place on-line during the inlet of the dispersion to the primary mixer and/or in the "conditioning mode" in a circulating line leading from the supply tank and back again.

Preferably the agglomeration reduction occurs at least on-line, perhaps additionally in the "conditioning mode."

The shear speeds acting on the pre-dispersion during the agglomerate reduction will be preferably more than 10^5/s.

Shear speeds greater than $3 \cdot 10^5$/s are highly preferred.

It is preferable to produce the shear speed by providing at least one perforated screen in the inlet /6
line to the primary mixer and/or to the circulation line, so that the pre-dispersion can be pressed at a high pre-pressure of preferably 20-150 bar, highly preferred 30-80 bar or even better, 30-50 bar.

Higher pressures are helpful, and with regard to the agglomeration they would even be desirable, but are technically only feasible at great expense.

With regard to this invention, the term shear speed means 3 times the average transit speed of the dispersion, divided by the radius of the perforated screen.

The at least one perforated screen will have preferably a diameter of no less than 0.5 mm, preferably between 1 and 1.5 mm. At diameters greater than 2 mm, the high shear speeds preferred in this invention at the preferred pressures are difficult to achieve. There is a risk of plugging when perforated screen diameters of less than 0.5 mm are used.

To ensure production quantities can be processed, several perforated screens can be set up in parallel, that is they will be subjected to the same pre-pressure. For example, it is useful to provide a perforated

plate with 4-10 perforated screens of 2 mm diameter or with 10-25 perforated screens with 1.5 mm diameter or with 25-50 perforated screens with 1 mm diameter, for a production quantity of 100 L/min of polyol filler dispersion.

If the type of employed filler will allow perforated screen diameters in the lower range according to the invention, without the perforated screens becoming plugged, then two or three perforated plates can be set up in sequence in the flow direction, since the required pressure to achieve a sufficient shear speed is smaller for smaller perforated screen diameters.

According to one additional preferred embodiment of the invention, every two perforated screens /7
are positioned opposite each other with the flow in opposite directions, so that the dispersion streams exiting from the perforated screens will impact against each other. Apparatus of this kind are known in principle, from documents EP-A 685 544 and WO 01/05517, for example, for the dispersion of droplets in the production of paint.

The invention will be explained in greater detail below based on the attached figures. We have:

Figure 1, one design embodiment with injection of additive substances and propellant into the same reaction component,

Figure 2, a design embodiment with injection of additive substance into the one reaction component and of propellant into the other one,

Figure 3, a design embodiment with injection of additive substance into a first polyol component and injection of the propellant into a second polyol component, and subsequent premixing of the two polyols,

Figure 4, a design embodiment analogous to Figure 3, with the difference that both polyols are supplied separately into the mixer,

Figure 5 shows the design embodiment of the agglomerate reducer,

Figure 6 shows an additional design embodiment of the agglomerate reducer.

In Figure 1 the device consists of a batch container 1, in which polyol moves from a supply container 2 through a line 4 equipped with a pump 3, and melamine additive moves from a supply container 5 through a line 7 equipped with a dosing worm gear 6. The batch is produced by means of an agitator 8. /8 A line 9 runs from the batch container 1 and leads through a dosing pump 10, a non-return valve 11, a filter 12, a mixer 13 and a pressure limiter valve 14 and leads to a primary mixer 15 designed as agitator mixer. In front of the non-return valve 11 a recirculation line 16 branches off and leads through a non-return valve 17 and an agglomerate reducer 18 according to this invention, back into the batch container 1. Carbon dioxide is held in a supply container 19 as propellant. A line 20 leads from it past a pump 21 and opens into the line 9 between the filter 12 and the mixer 13. The second reaction component is isocyanate and a line 24 leads from the supply container 22 for isocyanate past a dosing pump 23 and opens into the primary mixer 15. There are inlets 25 for other additives in the primary mixer 15. A discharge mechanism 26 producing the sudden pressure drop in the propellant is outlet connected to the primary mixer 15.

In Figure 2 the device consists of a batch container 31, and polyol is introduced into it from a supply container 32 through a line 34 equipped with a pump 33, and the melamine additive moves from a supply container 35 through a line 37 equipped with a dosing worm gear 36. The batch is produced by means of an agitator 38. A line 39 opens from the batch container 31 and leads through a dosing pump 40, an agglomerate reducer 41, a non-return valve 42 and a filter 43 into a primary mixer 44 designed as agitator mixer. The agglomerate reducer 41 can be adapted to different additive substances by means of a pressure indicator 57 and a control unit 58. Between the agglomerate reducer 41 and the non-return valve 42 a recirculating line 46 containing a non-return valve 45 branches off from the line 39 and leads back into the batch container 31. Carbon dioxide propellant is held in a supply container 47. A line 48

leads from this supply container through a pump 49 and opens into a line 52 between a dosing pump 50 and a mixer 51. This latter line leads from a supply container 53 for isocyanate and runs through a throttle 54 outlet connected to the mixer 51 and into the primary mixer 44. There are inlets 55 located in the primary mixer 44 for additional additives. A discharge mechanism 56 generating a pressure drop in the propellant is outlet connected to the primary mixer 44. The pump 40 generates a pressure so that /9 the dissolved carbon dioxide in the primary mixer 44 does not pass into the gaseous state, and furthermore a sufficiently large pressure difference prevails for the agglomerate reduction in the agglomerate reducer. The device should be run for a few hours in "conditioning mode" before beginning the production, preferably with the valve 42 closed and valve 45 open, and then during production with valve 42 open and valve 45 closed in "on line mode".

In Figure 3 the device consists of a batch container 61; a first polyol is fed into it from a supply container 62 through a line 64 equipped with a pump 63, and the melamine additive is introduced from a supply container 65 through a line 67 equipped with a dosing worm gear 66. The batch is created by means of an agitator 68. A line 69 leads from the batch container 61 and runs through a dosing pump 70, a non-return valve 71, a filter 72, a mixer 73 and a throttle 74 into a primary mixer 75 designed as agitator. In front of the non-return valve 71 a recirculating line 76 branches off and runs past a non-return valve 77 and an agglomerate reducer 78 back into the batch container 61. Carbon dioxide propellant is held in a supply container 79. A line 80 runs from the container through a pump 81 and runs together with a line 82 which leads through a dosing pump 83 from a supply container 84 for a second polyol. The combination line 85 runs through a mixer 86 and a throttle 87 between the filter 72 and the mixer 73 into the line 69. From a supply container 88 for isocyanate a line 90 branches off and runs through a dosing pump 89 and opens into the primary mixer 75. Inlets 91 for further additives are located in it. A discharge mechanism 92 is outlet connected to the primary mixer 75. The pressure drop

is designed by means of selection of the flow cross section of the discharge mechanism 92 so that the propellant will change from the liquid state into the gaseous state.

In Figure 4 the device consists of a batch container 101; a first polyol [charge] leads into it from a /10
supply container 102 through a line 104 equipped with a pump 103, and the melamine additive is introduced from a supply container 105 through a line 107 equipped with a dosing worm gear 106. The batch is created by means of an agitator 108. A line 109 leads from the batch container 101 and runs through a dosing pump 110, an agglomerate reducer 111, a non-return valve 112 and a filter 113 into a primary mixer 114 designed as an agitator. The agglomerate reducer 111 can be adapted to different additives by means of a pressure indicator 131 and a control unit 132. Between the agglomerate reducer 111 and the non-return valve 112, a recirculating line 116 containing a non-return valve 115 branches off from the line 109 and leads back into the batch container 101. Carbon dioxide propellant is held in a supply container 117. A line 118 runs from the container through a pump 119 and then together with a line 120 and opens into a line 121. The line 120 leads through a dosing pump 122 from a supply container 123 for a second polyol. A mixer 124 and a throttle 125 are located in the combination line 121; it opens into the primary mixer 114. In addition, a line 127 for isocyanate leading from a supply container 126 runs through a dosing pump 128 and opens into this primary mixer 114. Inlets 129 for further additives are provided in the primary mixer. A discharge mechanism 130 producing a pressure drop in the propellant is outlet connected to said mixer. The pressure drop can be designed by selection of the flow cross section of the discharge mechanism 130 so that the propellant will pass from the liquid state into the gaseous state.

Figure 5 shows an agglomerate reducer according to the invention, which consists of a perforated plate 504 located transverse to the direction of flow of the polyol-filler dispersion, with (preferably sharp

edge) transit perforations 503, and said agglomerate reducer is located in a tube section 501 which can be expanded if necessary (502).

Figure 6 shows an agglomerate reducer designed as insert 602 in a tube section 601, in which mutually opposing (preferably sharp edge) perforations are provided, through which the polyol-filler /11
dispersion is pressed, so that the dispersion jets exiting from the opposing perforations will impact against each other.

Claims /12

1. Method for producing of polyurethane foams made from at least two liquid reaction components which react with each other, whereby a powder, fibrous or fine-grain additive is admixed with at least one of these reaction components and a propellant which passes from the liquid state into the gaseous state after a corresponding sudden drop in pressure, is admixed with at least one of these reaction components, characterized in that

a) the additive substance and/or the propellant is added to and thus mixed in with at least one of the reaction components,

b) whereby the propellant is admixed in the liquid state,

c) that this reaction mixture loaded with propellant is expelled through a discharging mechanism (26, 56, 92, 130) which produces a sudden pressure drop, whereby the pressure drop is adjusted so that the liquid propellant passes from the liquid state into the gaseous state, and

d) any forming agglomerates of additive substance are broken down before they reach the discharging mechanism (26, 56, 92, 130).

2. Method according to Claim 1, characterized in that the same reaction component is used as a carrier for additive substance and propellant.

3. Method according to Claim 1, characterized in that one of the reaction components is loaded with additive substance and another of the reaction components is loaded with propellant.

4. Method according to Claim 1 or 2, characterized in that additive substance is admixed to one /13
branch of the reaction component and propellant is admixed to the other branch, and that subsequently both loaded branches of the reaction component are joined together and then premixed with each other if necessary, before they are mixed with the second reaction component.

5. Method according to Claim 1 or 2, characterized in that additive substance is admixed to one branch of the reaction component, propellant is admixed to the other branch, and that the two loaded branches of the reaction component are supplied separately to the second reaction component and mixed with it.

6. Method according to one of Claims 1-5, characterized in that at least one of the loaded reaction components is conditioned by moving through a cycle.

7. Method according to Claim 1-6, characterized in that the break down of agglomerates is accomplished in that shear speeds of greater than $10^5 \cdot /s^{-1}$ are created in the reaction component containing the filler.

8. Device for the production of polyurethane foams from at least two liquid reaction components which react with each other, consisting of supply containers (2, 5, 19, 22; 32, 35, 47, 53; 62, 65, 79, 84, 88; 102, 105, 117, 123, 126) for liquid or doseable reaction components, additive substances and propellant, and also consisting of a piping system connected to the supply containers (2, 5, 19, 22; 32, 35, 47, 53; 62, 65, 79, 84, 88; 102, 105, 117, 123, 126) and leading to a (primary) mixer (15; 44; 75; 114), characterized in that

a) in at least one line (9; 39; 69; 109) leading from one of the reaction component supply containers /14 (2, 22; 32, 53; 62, 84, 889; 102, 123, 126) to the (primary) mixer (15; 44; 75, 114) there is an inlet line (7/9; 37/39; 67/69; 107/109) leading away from the additive substance supply container (5, 35, 65, 105) and a line (20/9; 48/52; 80/85/69; 118/121) leading away from the propellant supply container (19; 47; 79; 117),

b) that the lines (9; 39, 52; 69; 85/69) for the loaded reaction components open into a (primary) mixer (15; 44; 75; 114),

c) that a discharging mechanism (26; 56; 92; 130) producing a sudden pressure drop is outlet connected to the (primary) mixer (15; 44; 75; 114), whereby the pressure drop is adjusted so that the propellant will pass from the liquid state into the gaseous state, and

d) that there is an agglomerate reducer (18; 41; 78; 111) located between the mouth of the inlet line (5; 35; 65; 105) for additive substance and the discharge mechanism (26; 56; 92; 130).

9. Device according to Claim 8, characterized in that both the inlet line (7; 67) for the additive substance, as well as the inlet line (20; 80/85) for the propellant open into the line (4/9; 64/69) leading from one of the reaction component supply containers (2; 62) to the (primary) mixer (15/ 75).

10. Device according to Claim 8, characterized in that the inlet line (37; 107) for the additive substance opens into the line (39; 109) leading from the first reaction component supply container (32; 102) to the (primary) mixer (44; 114), and the inlet line (47; 117) for the propellant opens into the line (52; 120/121) leading from the second reaction component supply container (53; 123) to the (primary) /15 mixer (44; 114).

11. Device according to Claim 8, characterized in that a batch container (1; 31; 61; 101) is outlet connected to the reaction component supply container (2; 23; 62; 102) of the reaction components to be loaded with filler, and from said batch container a line (9; 39; 69; 109) leads to a (primary) mixer (15; 44; 75; 114), and that from this line (9; 39; 69; 109) a cycle line (16; 46; 76; 116) leads back to the batch container (1; 31; 61; 101).

12. Device according to Claim 11, characterized in that the agglomerate reducer (18; 78) is located in the cycle line (16; 77).

13. Device according to one of Claims 8-12, characterized in that the agglomerate reducer consists of at least one perforated screen with a diameter of 0.5-2 mm.

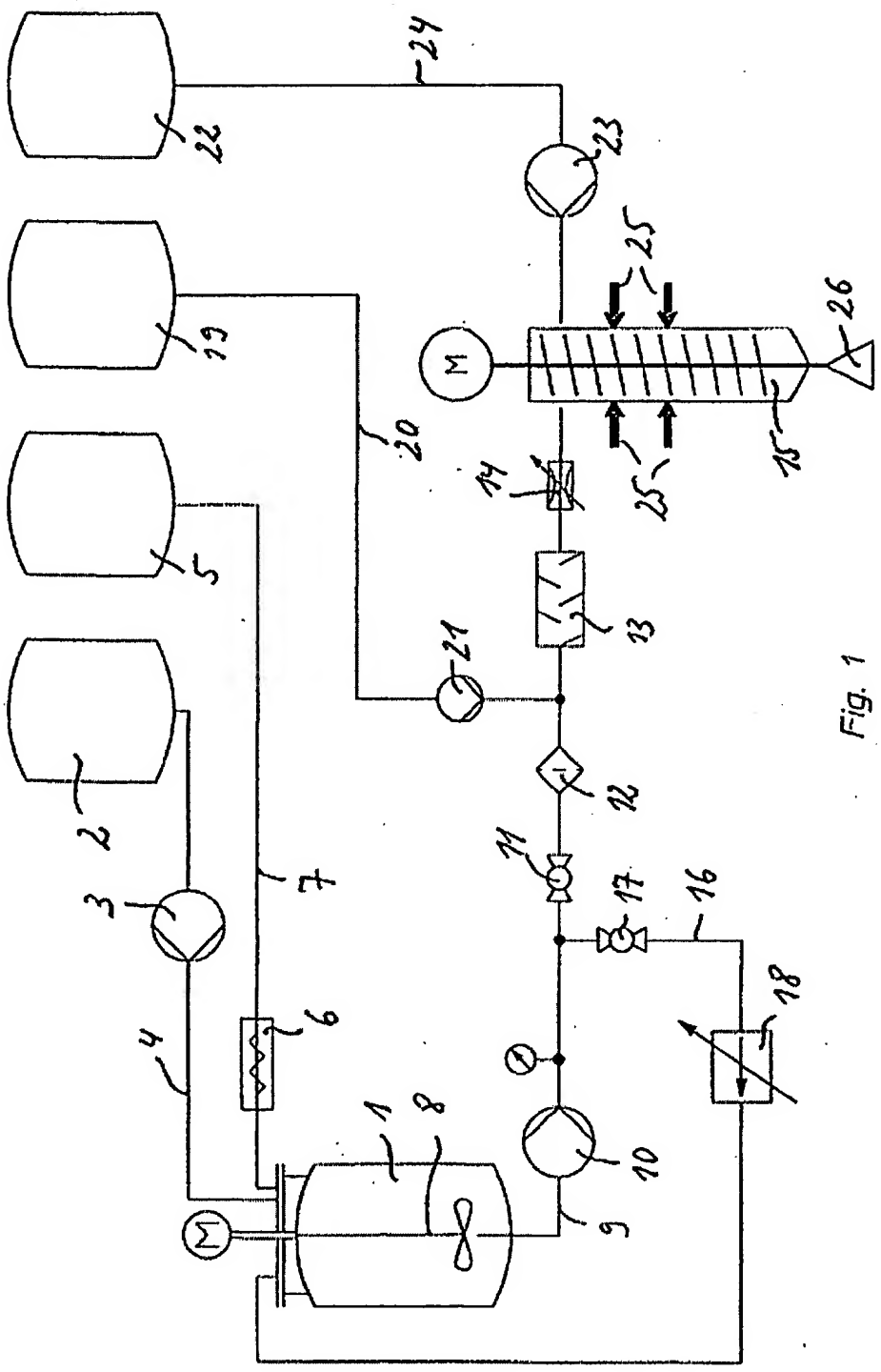

Fig. 1

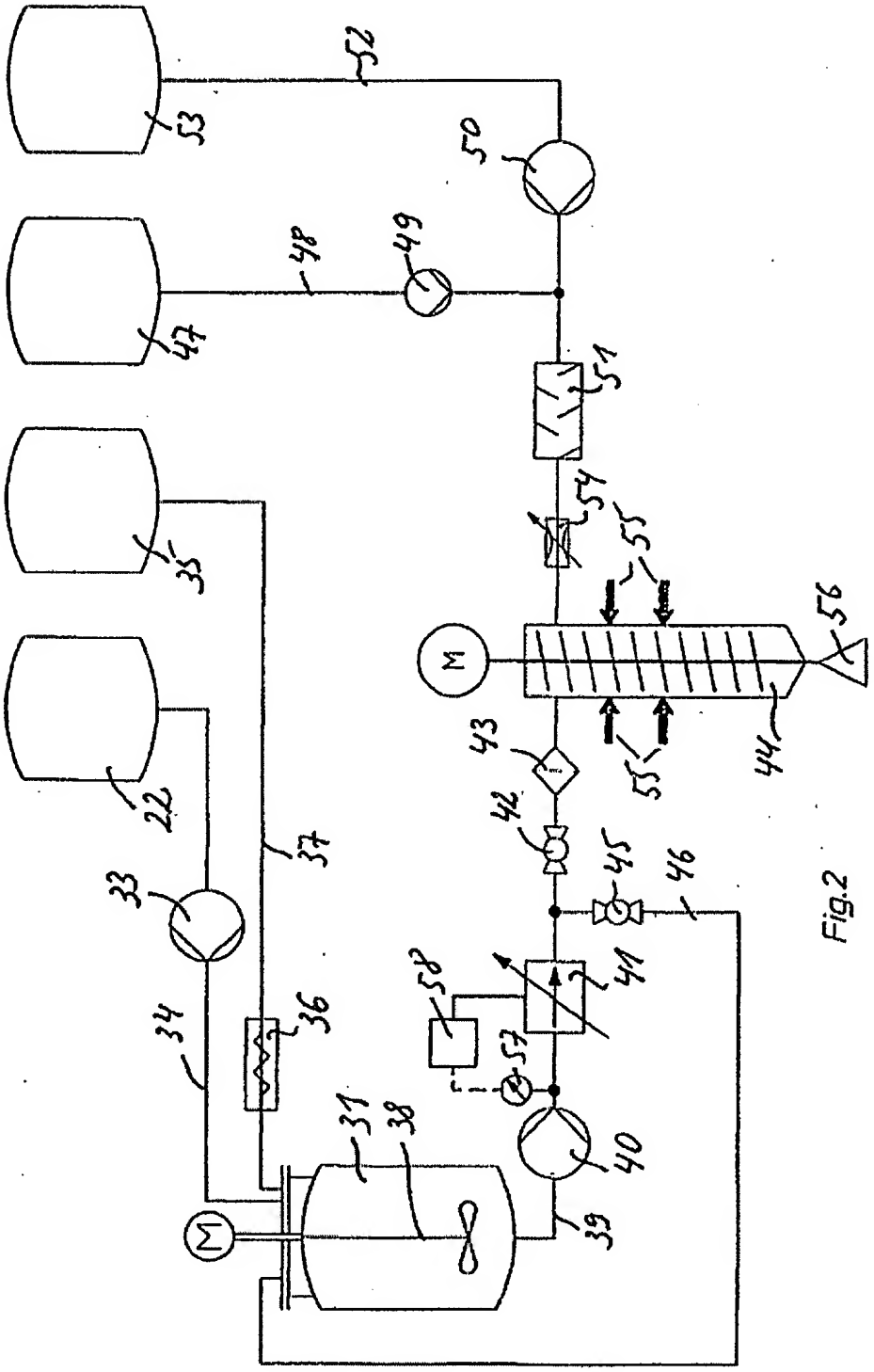
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Fig.2

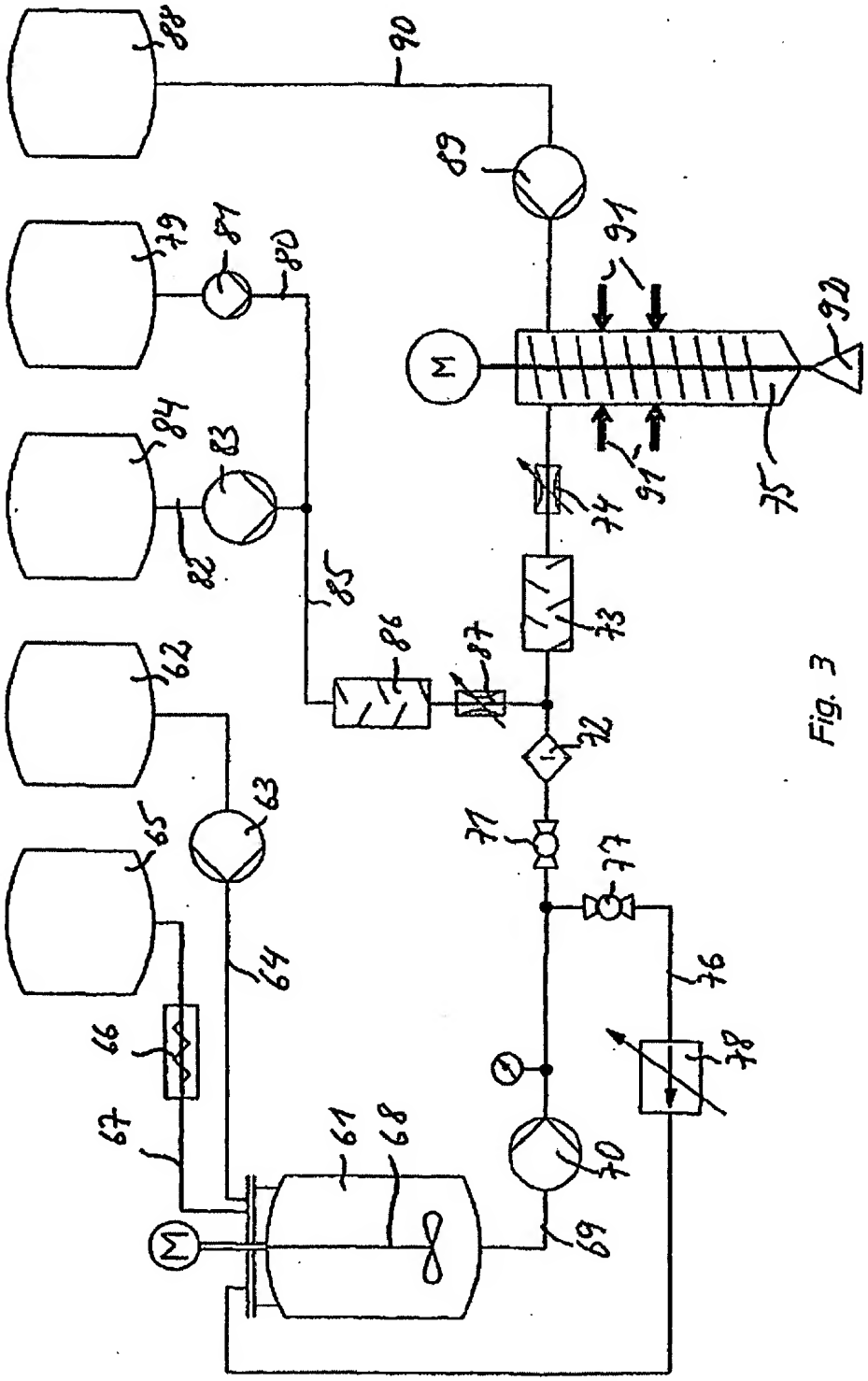
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Fig. 3

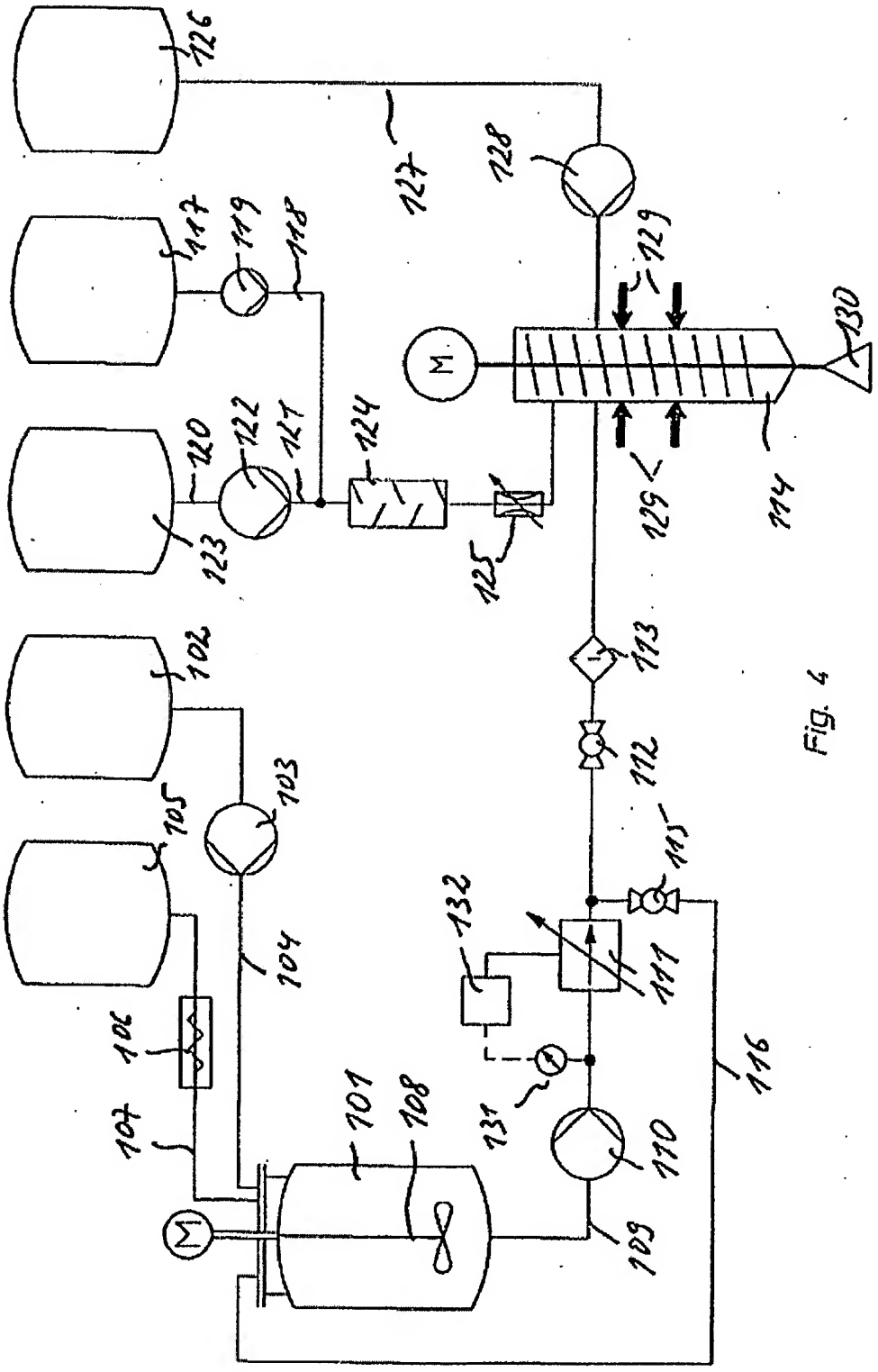
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Fig. 4

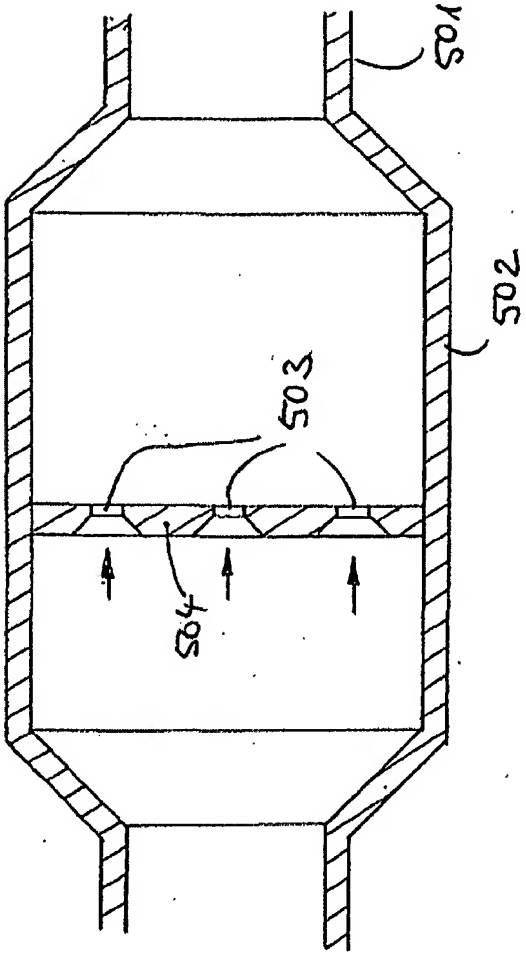

Fig. 5

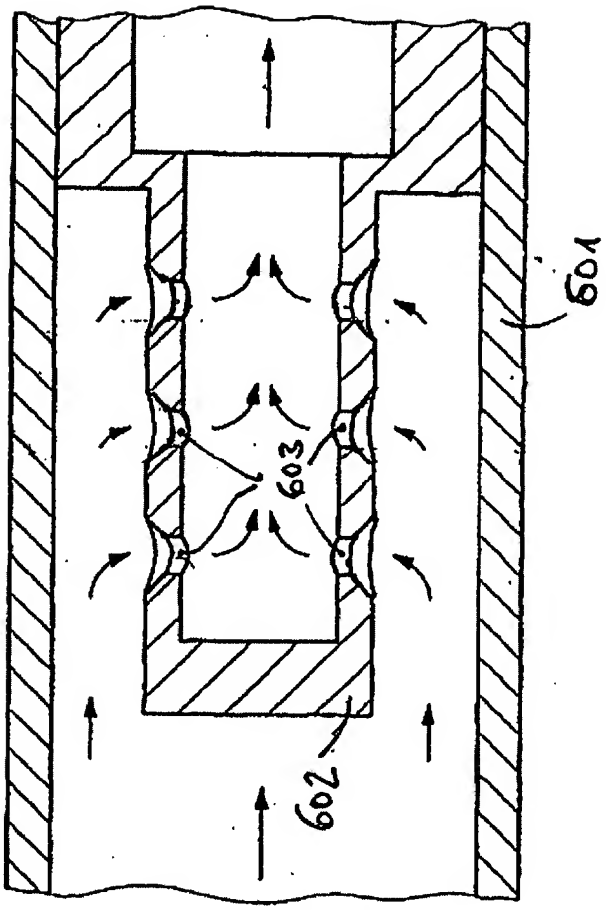

Fig. 6

INTERNATIONAL SEARCH REPORT

Inte ial Application No
PCT/EP 01/07214

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B29C44/46 B29C44/34 C08J9/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B29C C08J C08G C08K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 801 210 A (RADOVICH ET AL) 1 September 1998 (1998-09-01) column 2, line 38 -column 4, line 52; claim 1	1
A	EP 0 878 284 A (HENNECKE) 18 November 1998 (1998-11-18) column 2, line 26 -column 3, line 45; claims 1-5	1
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☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
6 November 2001	15/11/2001

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

Int[illegible]t Application No
PCT/EP 01/07214

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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CONFIRMATION NO. 1492

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/800,808	03/15/2004 RULE	521	1711	PO-7955/HE-178

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Jurgen Wirth, Koln, GERMANY;

** CONTINUING DATA **********

** FOREIGN APPLICATIONS **********

GERMANY 10311768.7 03/18/2003

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** 05/29/2004

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ yes ☐ no	GERMANY	3	35	2
35 USC 119 (a-d) conditions met ☑ yes ☐ no ☐ Met after Allowance				
Verified and Acknowledged Examiner's Signature Initials				

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TITLE

Process for the production of polyurethane foams

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
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